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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/560,073

12/09/2005

Takashi Masuko

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EXAMINER

DESAI, ANISH P

ART UNIT

PAPER NUMBER

1794

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/560,073	Applicant(s) MASUKO ET AL.	
	Examiner ANISH DESAI	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,3,6-18 and 21-33 is/are pending in the application.
- 4a) Of the above claim(s) 3,8,10-14,21-24 and 27-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,6,7,9,15-18,25,26 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>11/18/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed on 05/11/09 after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/11/09 and 08/11/09 has been entered.
2. The 35 USC Section 112-second paragraph rejections are withdrawn in view of applicant's amendment and response.
3. Upon reconsideration of the prior art of Takeda et al. (US 2001/0035533A1) as a whole and in view of applicant's declaration submitted on 08/11/09, the art rejections based on Takeda et al. are withdrawn. Takeda does not teach or suggest SP value, weight average molecular weight, and Tg of polyimide as presently claimed. Further, Takeda does not teach the tan delta peak temperature of the adhesive film and the flow amount as presently claimed. Similarly, the art rejections based on Takashi (JP 11-140386) are withdrawn.
4. A new 35 USC Section 103(a) rejection based on Fuji (JP 2000-104040) in view of Kikkawa et al. (US 2002/0048726A1) is made.

Information Disclosure Statement

5. The information disclosure statement filed 11/18/09 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.
6. There is no concise explanation of relevance for JP Office Action issued for 2002-332929.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 2, 6, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii (JP 2000-104040) in view of Kikkawa et al. (US 2002/0048726A1).

8. With respect to claim 33, Fujii discloses a die bonding adhesive layer that comprises polyimide resin and epoxy resin (abstract, 0012, and 0019), wherein the polyimide resin has Tg of 30 to 80°C (abstract and 0013). Further, at 0019 Fujii discloses that the epoxy resin is used in the amount of 0.1 to 200 weight section (equated to parts by weight) relative to 100 parts by weight of polyimide. As to the claim limitation of the polyimide is contained at 50% by weight or more of a total polyimide resin, it is noted that since Fujii discloses a polyimide resin, it is clear that said polyimide is contained at more than 50% by weight of the total polyimide resin.

9. With respect to claim 33, Fujii is silent as to teaching the weight average molecular weight of the polyimide as presently claimed.

10. However, Kikkawa discloses a polyimide precursor and polyimide obtained from the polyimide precursor (abstract, 0001 and 0028) that can be used as surface coating films for semiconductor devices (0001). Further, the polyimide of Kikkawa has adhesive properties (0139). Additionally, at 0028, Kikkawa discloses "The weight average molecular weight of the polyimide of the present invention is 10,000 to 200,000, preferably 20,000 to 60,000. The polyimide of the present invention can easily be

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obtained in the form of film of a complicated shape by use of the polyimide precursor of the present invention and hence is suitable for the protective film of a semiconductor device, etc."

11. It is noted that the Fujii's adhesive layer is applied on the surface of semiconductor wafer (abstract). Similarly, the adhesive of Kikkawa is also applied as a protective film on the wafer (0001) and it can be obtained in the form of film of complicated shape (0028).

12. Based on the above, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the polyimide having the weight average molecular weight including that of the presently claimed in the invention of Fujii, motivated by the desire to suitably use the polyimide that can be easily obtained in the form of film of complicated shape.

13. As to the claimed properties of the SP value of polyimide, "at least one of the polyimide resins being obtained by reacting a diamine and an acid dianhydride satisfying the condition where as difference...DSC is 10°C or smaller", tan delta peak temperature and the flow amount of the adhesive, it is reasonable to presume that said properties are necessarily present in the polyimide resin and adhesive of Fujii as modified by Kikkawa.

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14. The support for said presumption is based on the fact that the polyimide of Fujii as modified by Kikkawa has Tg and weight average molecular weight that is claimed by the present invention. Additionally, the adhesive of Fujii as modified by Kikkawa includes polyimide and epoxy resin, wherein the epoxy resin is contained in the same amount including that of the presently claimed. Further, the polyimide resin of Fujii formed by tetracarboxylic acid dianhydride and diamine (0013-0015). Likewise applicant's polyimide is formed by reaction between tetracarboxylic acid dianhydride and diamine.

15. Based on the above, the polyimide and the adhesive of Fujii as modified by Kikkawa and that of applicant are similar. Therefore, the aforementioned properties would necessarily be present in the invention of Fujii as modified by Kikkawa.

16. With respect to claim 2, the epoxy resin of Fujii as shown by Chemical Formula 1 in 0021 is tri functional epoxy resin.

17. With respect to claim 6, at 0023, Fujii discloses hardening agent (curing agent) for epoxy resin.

18. Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii (JP 2000-104040) in view of Kikkawa et al. (US 2002/0048726A1) as applied to claim 6 above, and further in view of Takashi (JP 11-140386).

19. It is noted that while Fujii at 0023 discloses phenol based curing agent, Fujii is silent as to teaching the specific phenol-based compound as presently claimed.

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20. However, Takashi discloses adhesive film comprising polyimide and epoxy resin (claims 1-4 of Takashi on page 2). Further, at 0039 on page 19, Takashi discloses epoxy curing agents such a phenolic compound having at least two phenolic hydroxy groups and having molecular weight of 400-1500.

21. Based on the above, it would have been obvious to select the phenolic compound of Takashi which reads on the phenol compound of the presently claimed invention, in the adhesive of Fujii, since it has been held that selection of a known material based on its suitability for its intended use establishes a *prima facie* case of obviousness.

22. With respect to claim 9, it is submitted that this claim requires that the epoxy resin curing agent be more in stoichiometric proportion than the epoxy resin. It is reasonable to presume that said feature would necessarily present in the invention of Fujii as modified by Kikkawa and Takashi given that Fujii as modified by Kikkawa and Takashi discloses similar epoxy resin (tri-functional) and phenol based curing agent (2 or more hydroxyl group in a molecule) as presently claimed. Alternatively, it would have been obvious to select the equivalent ratio as presently claimed so as to fully react epoxy resin in the end product.

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23. Claims 15, 16, 18, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii (JP 2000-104040) in view of Kikkawa et al. (US 2002/0048726A1) as applied to claim 33 above, and further in view of Nakaso et al. (US 5,690,837).

24. Fujii is silent as to teaching claims 15, 16, 18, and 26.

25. However, Nakaso discloses a process for producing multilayered circuit board which utilizes adhesive layer (e.g. polyimide) (abstract and column 4 lines 48-50).

Further, the adhesive layer of Nakaso comprises filler such as alumina, silica, aluminum nitride (insulating filler) and said filler is present in the amount 50% by volume or less (column 7 lines 13-15).

26. It would have been obvious to select the filler such as that of claimed by applicant's present invention which is taught by Nakaso in the adhesive of Fujii, motivated by the desire to provide suitable adhesiveness and fluidity to the adhesive layer (column 7 lines 17-20 of Nakaso).

27. Claims 17 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii (JP 2000-104040) in view of Kikkawa et al. (US 2002/0048726A1) and further in view of Nakaso et al. (US 5,690,837) as applied to claim 15 above, and further in view of Hotta et al. (US 5,904,505).

28. Fujii is silent as to teaching claims 17 and 25.

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29. However, Hotta discloses a process for producing a metal foil-covered semiconductor device which utilizes an adhesive that fixes a metal foil to the semiconductor device (column 5 lines 15-20). Further, the adhesive of Hotta includes thermosetting resins including polyimide resin (column 6 lines 29-31). Additionally, the adhesive of Hotta includes filler in order to effectively control the adhesion force (column 5 lines 30-35). Additionally, as shown in Examples 3 and 4 of Hotta the filler has average particle diameter of 10 μm or smaller (e.g. 0.8 μm in Example 3) and maximum diameter is 25 μm or smaller (e.g. 20 μm in Example 3).

30. Based on the above, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the filler having the diameter as presently claimed which is taught by Hotta in the adhesive of Fujii, motivated by the desire to effectively control the adhesive force of Fujii's adhesive.

Response to Arguments

31. As to applicant's arguments against the prior art of Takashi, it is submitted that as set forth in the present application Takashi is relied upon as a teaching reference and therefore, it is not necessary for this secondary reference to contain all the features of the presently claimed invention. Rather this reference teaches a certain concept,

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namely epoxy resin curing agent of claim 7 and in combination with the primary reference, discloses the presently claimed invention.

Conclusion

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANISH DESAI whose telephone number is (571)272-6467. The examiner can normally be reached on Monday-Friday, 9:00AM-5:30PM.

33. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

34. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. D./

Examiner, Art Unit 1794

/Callie E. Shosho/

Supervisory Patent Examiner, Art Unit 1794